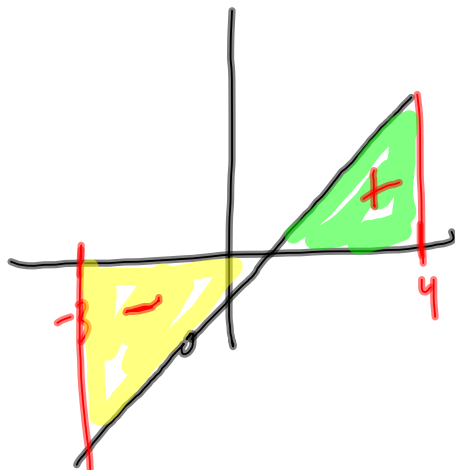


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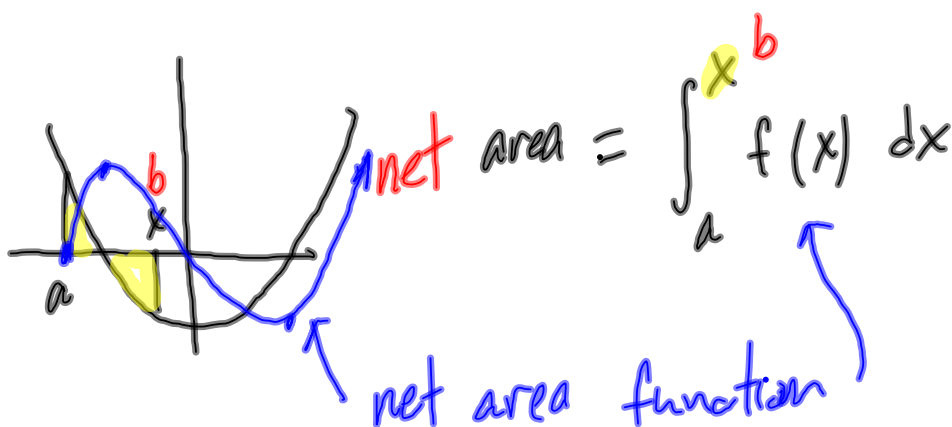
$$\int_{-3}^4 \frac{x^2-1}{x+1} dx = \int_{-3}^4 \frac{(x+1)(x-1)}{\cancel{x+1}} dx$$

hole at $x = -1$

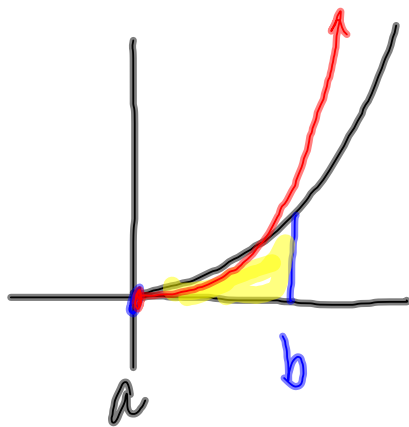


Nov 17-10:35 AM

5.3 Fundamental Theorem of calculus



Nov 17-11:41 AM



$$f(x) = x^2$$

$$\int_0^b x^2 dx = \frac{b^3}{3}$$

sketch the graph

$$\int_0^2 x^2 dx = \frac{2^3}{3} = \frac{8}{3}$$

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use
calc

$$\int_0^b 3x^2 dx = b^3$$

$$\int_0^b x^3 dx = \frac{b^4}{4}$$

$$\int_0^b 5x^4 dx = b^5$$

$$\frac{x^{n+1}}{n+1} = \frac{b^{n+1}}{n+1}$$

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predict $\int_a^b x^2 dx = \frac{b^3}{3} - \frac{a^3}{3}$

$$\int_1^3 3x^2 dx = x^3 \Big|_1^3 = 3^3 - 1^3$$

$$= 26$$

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definite integral

FTC

$$\int_a^b f(x) dx = F(b) - F(a)$$

where $F(x)$ is an antiderivative
of $f(x)$

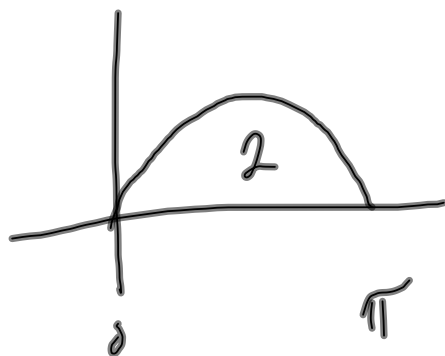
$$F(x) = \int f(x) dx$$

indefinite integral

or $F'(x) = f(x)$

Nov 17-12:24 PM

$$\int_0^{\pi} \sin x \, dx = -\cos x \Big|_0^{\pi} = -\cos \pi - (-\cos 0) \\ = -(-1) + 1 = 2$$



Nov 17-12:28 PM

$$\int_0^1 \frac{1}{1+x^2} \, dx = \tan^{-1} x \Big|_0^1 \\ = \tan^{-1} 1 - \tan^{-1} 0 \\ = \frac{\pi}{4} - 0 \\ = \frac{\pi}{4}$$

Nov 17-12:34 PM